Mitochondria as Playmakers of CAR T-cell Fate and Longevity.

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Public Summary:
The development of chimeric antigen receptor (CAR) T-cell therapy has led to a paradigm shift in cancer treatment. However, patients often do not benefit from CAR T-cell therapy due to poor persistence of the adoptively transferred cells. Development of strategies based on the generation and maintenance of long-lasting memory T cells may expand the therapeutic effects of CAR T cells. Mitochondrial metabolic pathways play crucial roles in regulating the fate, function, and longevity of T cells. Here, we discuss how reprogramming of mitochondrial metabolic pathways influences function, persistence, and determination of CAR T-cell fate toward a memory phenotype. Moreover, we explore how mitochondrial activity determines persistence and the clinical outcome of CAR T-cell therapy. In addition, we review some strategies for manipulating CAR T-cell mitochondria to improve the survival of CAR T cells.

Scientific Abstract:
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